Biobot Analytics

We are building early warning health analytics from data available in our sewers.

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Biobot is a spin-off from MIT

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Background:
Architecture & Engineering
MIT Research Fellowship on smart city technologies

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Background:
Computational Biology & Microbiology
MIT PhD dissertation on wastewater epidemiology
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Peter Chai, MD
Professor of Emergency Medicine, Harvard Medical School
Biobot’s Covid-19 WBE work in the news
Biotech innovation award: #3 behind Pfizer and Moderna

1. PFIZER-BIONTECH
For being first to market with an effective COVID-19 vaccine

1. MODERNA
For making a COVID-19 vaccine that can travel

3. BIOBOT ANALYTICS
For using sewage to detect the next surge

4. OXFORD UNIVERSITY-ASTRAZENECA
For finding a different path to a COVID-19 vaccine
Our wastewater epidemiology platform enables early warning health analytics to combat pandemics.

**Predictive**
Wastewater data is a leading indicator for new infectious disease cases.

**Inclusive**
Everyone has a voice in the sewer. Our data includes everyone, not just people who access clinical care.

**Versatile**
Wastewater is a rich source of health data, including Covid19, influenza, opioids, diet, stress, and others.
We started by addressing the opioid epidemic
Neighborhood-level data on opioid use, overdose & treatment
Rapid response to Covid-19
How it works

1. Ordering
   - Customers order sample kits
   - Biobot's fulfillment partner overnight ships kits directly to the customer site

2. Shipping Kit
   - Customers collect composite wastewater samples and ships them in Biobot provided transportation kits
   - Customers input site/day specific metadata into Biobot's customer web portal for each sample

3. Lab Analysis
   - Upcoming: sequencing for C19 variants & metabolomics for opioids and other high-priority drugs.

4. Data Analysis
   - Testing results flow through Biobot's automated computational data analysis pipelines where they are ingested, QC’ed and validated

5. Reporting
   - Summary data analysis, findings and visualizations are packaged as reports and sent directly to customers or uploaded to a dashboard

www.biobot.io
Nationwide Wastewater Monitoring Network

- **Regions Selected:** Nationwide

- **46 states + provinces**
- **500 communities**
- **8000+ samples tested**
- **13% of U.S. population**

Explore the data! www.biobot.io/data

- Wastewater: Normalized SARS-CoV-2 virus concentration (copies/mL of sewage)
- Clinical: New daily clinical cases per 100k people

Powered by Biobot Analytics
HHS Covid-19 wastewater monitoring program

- No-cost program for 320 communities.
- Testing started June 7th, 2021, and will continue for 10 weeks.
- We are generating SARS2 qPCR concentrations + Genomic sequencing data to study variants.
- qPCR data will be reported through HHS Protect and CDC NWSS.
- Sequencing data will be uploaded to NCBI.

Want to hear more or get involved? Email support@biobot.io

50 states 320 communities 100M people tested 6,000 samples tested
Independent confirmation of clinical data trends
Wastewater data can be analyzed side-by-side with clinical data to get independent confirmation of trends.

Outbreak detection for early intervention
On a background of little disease activity, wastewater can detect as few as 3 cases in a population of 1,500.

Ranking amongst nationwide database
We contextualize if the level of infection is low or high, by comparing against our nationwide database of communities.


“Applications of wastewater-based epidemiology as a leading indicator for COVID-19”, Olesen, O. et al., Preprint arxiv, 2021
Wastewater data serves as an independent confirmation of clinical data trends
Nationwide trends (legend)
7-day average of new cases
3-sample average wastewater concentration
“It’s amazing how many residents wait for these numbers and have come to trust these more than [clinical] testing”

— Wastewater treatment plant director in the State of Massachusetts
Outbreak detection on a background of little disease activity

Late Jan/early Feb 2021: Low levels of virus in wastewater

Feb 18: There are no known infections among patients, but wastewater virus spikes. Community responds by testing all patients.

Testing reveals that **13 of 60 patients (22%) are infected**. Most are likely presymptomatic.

Further infections are prevented.

Fraction of people known to be infected: **>15% 0-5%**
Ranking amongst nationwide database

Your sample is in the **34th percentile** from all samples tested in the past 6 weeks.
We can build dozens of applications with our platform
Thank you.

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